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...e magazine of the farm & industrial equipment industry

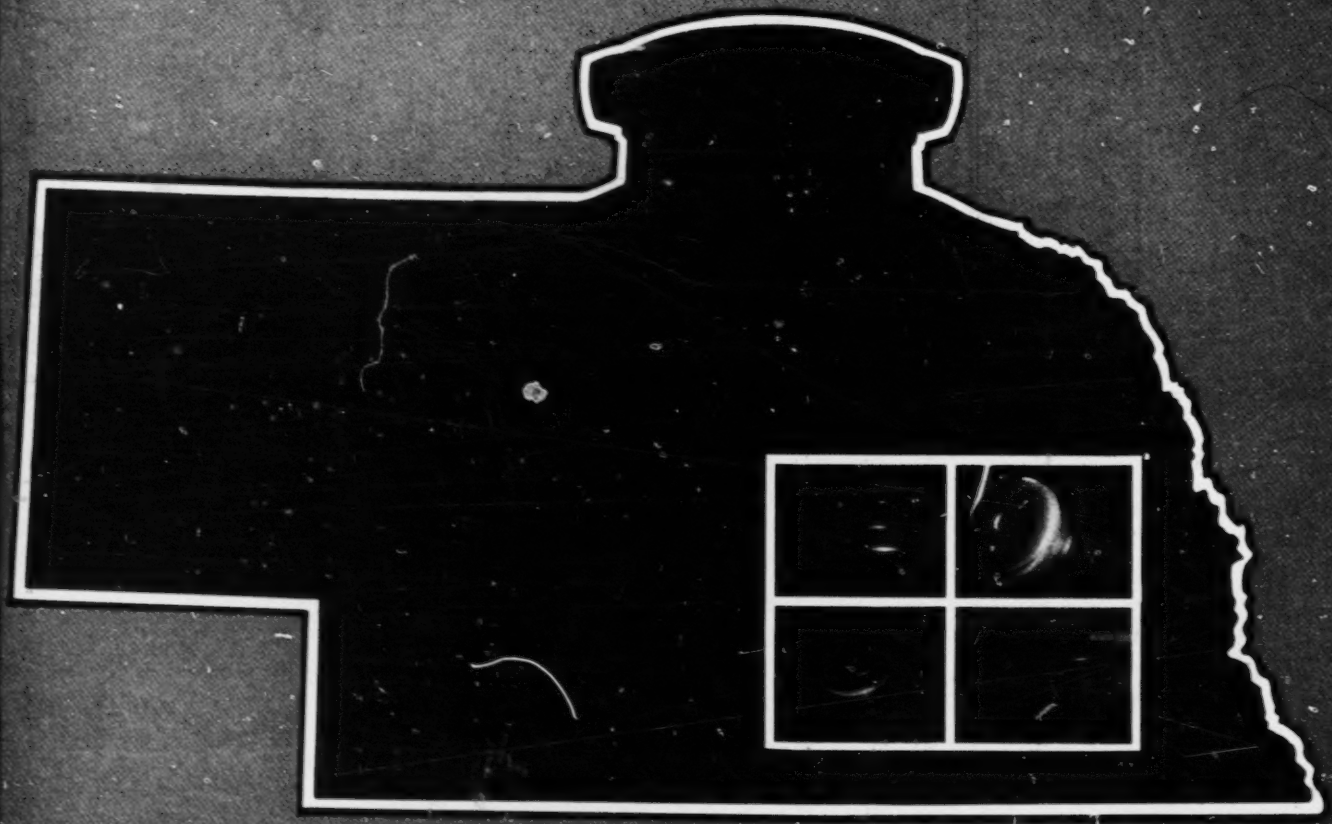
March 21, 1982
TWO DOLLARS

Implement & Tractor

C4725-1 4/1/82

What Nebraska Tests say about the industry's

FUEL EFFICIENCY PROGRESS



Walt Buescher on the Selling Mission page 20

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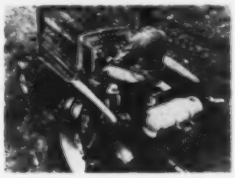

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Regardless of what you see....

...this issue of I&T is not an Allis-Chalmers special. It's just that three articles with A-C connections came into maturity, ready for the press, in time for this issue—a piece about A-C's new line, a report about electric vehicles for farming that recalls that company's experimental fuel-cell tractor of 1959, and some selling wisdom from a retired A-C marketing executive.

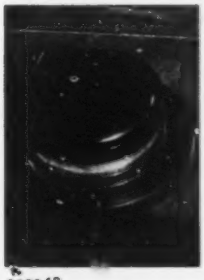
8: **Allis-Chalmers Brings Out New Products.** Major offering is a new line of two-wheel-drive tractors.

14: **Onan's L Series Diesel Engines.** Alabama factory's output could be used in, among other applications, intermediate tractors.

18: **Tractor Fuel Efficiency: Not a Great Track Record.** A by-brand review of Nebraska Test data from 1959 through 1981.

20: **Walt Buescher: Tough Times Mean Opportunity!** Former A-C sales training and sales promotion specialist provides insights as part of I&T's Year of the Salesman special focus.

26: **Future for Electric Tractors?** A study, mandated by Congress, produced a qualified yes. (Waiting for a battery breakthrough.)



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On the cover... The topic was fuel efficiency in tractors, so our artist got to playing with snapshots of fuel caps on dealers' lots at Lawrence, Kan.

DEPARTMENTS

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RETAIL SALES OF SELECTED FARM EQUIPMENT – Jan.-Dec. 1980 and 1981(1)
(In Units)

	Combines Self-Propelled		Corn Heads		Hay Balers(2)		Windrowers Self-Propelled Power Units		Windrowers Self-Propelled Total Heads		Grinder-Mixers		Shear-Bar Forage Harvesters(3)	
	1980	1981	1980	1981	1980	1981	1980	1981	1980	1981	1980	1981	1980	1981
Alabama	245	261	66	61	153	221	2	.....	1	.....	135	91	37	37
Alaska	5	5	.....	.....	19	14	3	.....	4	.....	1	3	.....	1
Arizona	60	82	7	2	44	50	64	63	76	73	8	7	11	13
Arkansas	672	820	5	4	186	275	.....	5	.....	5	82	44	11	14
California	284	353	53	62	174	162	281	287	311	317	5	6	74	91
Colorado	341	337	158	130	437	395	222	209	237	226	68	56	102	58
Connecticut	.....	1	.....	2	58	55	.....	.....	.....	.....	1	1	42	42
Delaware	43	30	44	32	15	8	1	1	1	1	8	10	12	3
Florida	78	64	51	30	77	86	.....	2	.....	2	46	16	26	34
Georgia	384	458	302	215	197	244	1	.....	1	.....	265	97	105	93
Hawaii	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....
Idaho	440	443	22	14	600	495	404	291	413	306	66	31	75	41
Illinois	2,708	2,734	2,821	2,683	327	246	23	11	23	13	496	365	261	214
Indiana	1,489	1,315	1,615	1,345	316	303	8	8	8	8	390	229	191	128
Iowa	2,928	2,966	3,108	3,182	328	304	137	129	145	141	1,290	954	565	390
Kansas	1,888	1,768	343	209	312	343	290	281	300	298	252	163	263	178
Kentucky	363	364	284	238	292	332	3	27	3	30	306	187	182	159
Louisiana	447	416	3	5	68	121	.....	.....	.....	.....	21	13	19	11
Maine	7	8	.....	4	70	76	2	.....	2	.....	1	2	46	37
Maryland	149	146	171	167	118	90	13	7	14	7	39	27	77	72
Massachusetts	.....	.....	.....	.....	50	45	6	.....	6	.....	3	.....	39	33
Michigan	596	595	566	581	382	286	64	45	65	46	263	181	420	296
Minnesota	1,652	1,819	1,481	1,377	735	673	648	592	666	624	629	536	873	649
Mississippi	543	536	6	15	79	127	2	.....	2	.....	48	38	62	49
Missouri	1,043	1,319	501	430	436	528	86	46	94	48	503	337	191	130
Montana	414	569	7	11	388	285	443	416	491	470	76	52	37	39
Nebraska	1,517	1,497	1,416	1,173	211	185	307	288	321	309	504	362	359	320
Nevada	3	3	.....	.....	40	30	59	49	63	51	2	2	8	7
New Hampshire	.....	.....	.....	.....	58	52	.....	.....	.....	.....	.....	2	34	33
New Jersey	26	19	21	12	41	39	1	.....	1	.....	11	11	17	8
New Mexico	42	50	16	7	128	144	63	61	67	65	12	12	9	6
New York	191	206	243	266	769	588	69	53	70	54	129	117	853	776
North Carolina	419	482	400	420	303	287	2	1	2	1	162	118	96	97
North Dakota	1,014	1,352	58	124	58	69	588	762	639	850	146	111	144	197
Ohio	1,213	868	1,132	864	528	485	9	10	9	10	406	250	269	211
Oklahoma	642	650	23	13	407	504	104	113	111	119	131	84	38	34
Oregon	243	247	10	23	413	323	281	207	301	234	33	23	49	57
Pennsylvania	198	217	291	252	751	670	55	43	57	44	321	230	539	489
Rhode Island	.....	.....	.....	.....	7	2	7	.....	6	.....	.....	.....	1	2
South Carolina	221	221	131	106	85	98	.....	.....	.....	.....	66	38	37	39
South Dakota	513	586	302	291	98	83	538	466	580	524	332	221	395	323
Tennessee	381	458	156	126	389	528	1	2	1	2	207	181	145	147
Texas	974	1,219	303	268	762	1,120	86	93	91	106	250	170	85	84
Utah	40	46	10	5	339	338	131	129	144	135	33	16	99	59
Vermont	1	9	1	14	110	106	4	5	4	5	.....	3	159	115
Virginia	125	159	127	129	393	303	7	10	7	11	97	79	202	164
Washington	460	447	39	50	432	384	195	122	198	149	21	9	146	76
West Virginia	5	3	7	3	166	128	1	.....	1	.....	38	15	31	29
Wisconsin	675	620	832	717	1,481	1,207	394	290	403	300	542	425	1,978	1,499
Wyoming	59	60	14	16	192	210	197	167	213	176	27	20	45	20
U.S. Government	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Miscellaneous (4)	.....	3	7	22	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
TOTAL	**25,741**	**26,831**	**17,154**	**15,700**	**14,022**	**13,647**	**5,802**	**5,291**	**6,152**	**5,760**	**8,468**	**5,945**	**9,461**	**7,604**

Data released Feb. 22, 1982, Farm & Industrial Equipment Institute.

(1) Includes revisions for prior months.
(2) For making bales of under 200 lbs.
(3) Pull-type, mounted, self-propelled.
(4) Sales reported as miscellaneous are retail sales which cannot be classified by state or as U.S. Government. They include sales and dispositions that do not go through usual marketing channels such as gifts to non-profit organizations, intra-plant or company transfers, etc.

Mower Conditioners All Types 1980	1981	Manure Spreaders Conveyor-Type 1980	1981	
141	172	18	17	Alabama
8	12	1	3	Alaska
12	15	8	6	Arizona
371	474	89	79	Arkansas
45	43	70	63	California
160	141	58	46	Colorado
96	55	64	60	Connecticut
19	10	58	45	Delaware
87	91	31	25	Florida
229	213	47	32	Georgia
.....	.....	1	.....	Hawaii
167	151	137	104	Idaho
606	543	593	477	Illinois
529	495	489	400	Indiana
1,095	977	1,393	1,234	Iowa
638	634	201	137	Kansas
817	917	266	244	Kentucky
48	80	29	16	Louisiana
117	108	113	58	Maine
116	103	215	145	Maryland
53	57	72	58	Massachusetts
685	471	750	634	Michigan
1,062	988	1,537	1,204	Minnesota
101	105	19	17	Mississippi
1,199	1,461	321	252	Missouri
155	168	51	26	Montana
485	463	345	192	Nebraska
9	9	5	4	Nevada
75	56	59	37	New Hampshire
58	39	55	41	New Jersey
23	27	11	8	New Mexico
1,178	1,017	1,545	1,311	New York
285	251	145	103	North Carolina
140	180	107	66	North Dakota
808	632	820	645	Ohio
617	673	57	29	Oklahoma
279	184	112	79	Oregon
934	784	1,222	1,005	Pennsylvania
4	3	.....	.....	Rhode Island
79	135	30	14	South Carolina
91	134	216	175	South Dakota
569	755	156	123	Tennessee
1,120	1,467	144	139	Texas
205	181	118	85	Utah
250	195	223	202	Vermont
674	529	232	137	Virginia
262	201	137	95	Washington
177	152	64	61	West Virginia
2,519	1,895	2,253	1,814	Wisconsin
55	75	37	26	Wyoming
.....	.....	.....	.....	U.S. Government
.....	.....	8	.....	Miscellaneous
19,452	**18,521**	**14,733**	**11,773**	**TOTAL**

INDUSTRY IN MOTION

Marliss Industries, Jonesboro, Ark., announces the addition of two product design engineers—Tony Speer and Mike Spencer. Both men hold BSAE degrees from Arkansas State U. at Jonesboro.

Dickey-john Corp., Auburn, Ill., producer of electronic instrumentation for agriculture, will be marketing on-farm computer systems through its newly formed Agricultural Management/Computer Systems Div. Jack Barber is manager of the new division. Dickey-john has selected the Xerox 820 information processor as the hardware foundation for its system and will supply software as an integral part of their management systems.

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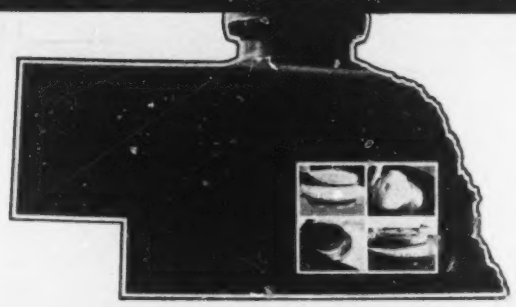

THE INDUSTRY'S TRACTOR FUEL EFFICIENCY: NOT A STRONG TRACK RECORD

I&T's engineering editor studies the Nebraska Tractor Tests and compares horsepower-hours per gallon. Two myths are tucked away – partly, anyway. Would you like to get in on the debate?

By Frank Buckingham

■IT'S BEEN more than eight years since the 1973 oil embargo, the first cries of "fuel shortage," and the start of ever-escalating fuel prices. Fuel in most areas of the country now costs several times what it did just 10 years ago. If we paint the tractor industry with one brush, average fuel efficiency is worse now than it was in the early 1970's. That could be called progress – straight to the rear.

There are a few somewhat brighter spots, though, but a close examination of Nebraska Tractor Tests shows little for the industry to brag about. Such an examination also shoots holes in a few popular myths.

First, let's explain the rules

Initial plans were to compare Nebraska Tractor Tests from the past 10 years with the tests from the 10 years before that – 1961-1981. However, due to some changes in test procedures and publication of test results in the *I&T Red Book*, it was more convenient to go back to Jan. 1, 1959. Also, current *Red Books* list 10 years of tests.

So, the 1971 *Red Book* was used for 1959-70 tests, and the 1981 issue for 1971-80 tests. Individual test reports from Nebraska provided 1981 test information.

In that 23 year period, 1959-81, there were 721 tests reported: 185 non-diesel and 536 diesel tractors, including 19 diesel crawlers. However, this study has been limited to wheeled, diesel tractors – 517 of them, from less than 20 to more than 400 db hp.

A number of studies show that fuel consumption at 75 per cent of maximum drawbar load in the Nebraska Tractor Test is a reasonable approximation of tractor fuel consumption under load in normal field work. Other studies indicate that average annual fuel consumption for general work can be approximated by using fuel consumption at rated engine speed and 50 per cent of maximum drawbar load. So, these two tests have provided the basis for this study, and we've used hp-hrs/gal. to put all tractors on an equal basis, to show how much work each one can do on a gallon of fuel.

Someone else might pull different figures from these tests and interpret them differently, or even find a different picture in the same figures we've used. But the underlying fact remains that we seem to have made very little progress in tractor fuel efficiency in the past quarter century.

Tabulation

Hp-hrs/gal. at 75 and 50 per cent of maximum drawbar load was tabulated by tractor model, and these figures averaged by manufacturer and for all tractors over five different periods. The results were disappointing, but not totally unexpected. There were, however, some real surprises.

The periods included 1959 through 1970 (called 59-70 tests); 1971 through 1978 (71-78); 1979 through 1981 (79-81); 1971 through 1981 (71-81); and the 23 year average, 1959 through 1981 (59-81 tests).

Readers are welcome to study the figures and rank manufacturers as first, second, last, etc. We've chosen to simply present the data, which largely speaks for itself, and will point out what we believe are some significant features.

Down with myths

We obviously couldn't print figures for all the individual tractor models; space is limited. But examination of that data shot down some seemingly accepted "facts" (myths would be a better term) about tractor fuel efficiency.

Myth No. One: Big tractors are more efficient than smaller tractors. The test results (71-81) show this is not true. The largest tractor in the 10 most efficient (75 per cent drawbar load) was the 250-hp Belarus 7100 four-wheel drive. But the other nine "most efficient" tractors in that period averaged 58.25 maximum db hp, and ranged from 29.66 to 74.46 maximum db hp.

The 10 tractors with the lowest efficiency in that period (71-81) had an average maximum drawbar horsepower of 51.43 – with a range of 13.03 to 88.13. So, what hap-

Average Tractor Fuel Efficiency, HP/Hours per Gallon

(Nebraska Tests, 1959-1981, at 75 and 50 Pct. of Drawbar Load)

Brand	1959-1970		1971-1978		1979-1981		1971-1981		1959-1981	
	75% Max.	50% Max.	75% Max.	50% Max.	75% Max.	50% Max.	75% Max.	50% Max.	75% Max.	50% Max.
Allis-Chalmers	12.40(12)*	10.64(12)	12.06(18)	10.04(18)	11.87(5)	9.98(5)	12.01(23)	10.03(23)	12.14(35)	10.24(35)
Belarus	.....	.....	13.27(3)	11.69(3)	14.17(2)	12.41(2)	13.63(5)	11.97(5)	13.63(5)	11.97(5)
Big Bud	.....	.....	.....	.....	13.97(1)	12.01(1)	13.97(1)	12.01(1)	13.97(1)	12.01(1)
Case/David Brown	13.02(34)	11.45(34)	12.58(28)	10.98(28)	12.67(14)	11.09(14)	12.61(42)	11.02(42)	12.79(76)	11.21(76)
John Deere	12.17(25)	10.43(25)	11.81(25)	9.96(25)	11.86(13)	10.05(13)	11.82(38)	9.99(38)	11.96(63)	10.17(63)
Deutz	.....	.....	14.12(10)	12.51(10)	13.73(5)	12.04(5)	13.99(15)	12.35(15)	13.99(15)	12.35(15)
FWD Wagner	12.45(2)	11.05(2)	.....	.....	.....	.....	.....	.....	12.45(2)	11.05(2)
Ford	12.67(27)	11.15(27)	12.21(22)	10.51(22)	11.78(5)	10.16(5)	12.13(27)	10.45(27)	12.40(54)	10.80(54)
Hesston-Fiat(a)	11.18(2)	9.22(2)	13.67(4)	11.82(4)	13.46(7)	11.85(7)	13.53(11)	11.84(11)	13.17(13)	11.44(13)
International Harvester	11.84(24)	10.22(24)	11.68(30)	9.92(30)	12.04(18)	10.25(18)	11.82(48)	10.05(48)	11.82(72)	10.10(72)
Kramer	11.40(1)	9.82(1)	.....	.....	.....	.....	.....	.....	11.40(1)	9.82(1)
Kubota	.....	.....	10.85(8)	9.23(8)	11.78(8)	10.20(8)	11.32(16)	9.71(16)	11.32(16)	9.71(16)
Lamborghini	.....	.....	12.74(1)	10.93(1)	.....	.....	12.74(1)	10.93(1)	12.74(1)	10.93(1)
Leyland	.....	.....	12.57(3)	10.68(3)	11.89(2)	10.29(2)	12.30(5)	10.52(5)	12.30(5)	10.52(5)
Long	.....	.....	13.15(4)	11.42(4)	13.12(4)	11.58(4)	13.13(8)	11.50(8)	13.13(8)	11.50(8)
Massey-Ferguson	13.31(20)	11.75(20)	12.75(18)	11.10(18)	11.27(19)	9.51(19)	11.99(37)	10.28(37)	12.45(57)	10.80(57)
Nuffield	13.24(3)	11.86(3)	.....	.....	.....	.....	.....	.....	13.24(3)	11.86(3)
Porsche	10.81(2)	9.46(2)	.....	.....	.....	.....	.....	.....	10.81(2)	9.46(2)
Same	.....	.....	12.61(3)	10.67(3)	.....	.....	12.61(3)	10.67(3)	12.61(3)	10.67(3)
Satoh	.....	.....	.....	.....	11.18(1)	9.58(1)	11.18(1)	9.58(1)	11.18(1)	9.58(1)
Steiger	.....	.....	12.67(14)	10.96(14)	13.06(3)	11.01(3)	12.74(17)	10.97(17)	12.74(17)	10.97(17)
Ursus	12.59(2)	11.72(2)	.....	.....	.....	.....	.....	.....	12.59(2)	11.72(2)
Versatile	.....	.....	.....	.....	12.32(4)	10.11(4)	12.32(4)	10.11(4)	12.32(4)	10.11(4)
White(b)	12.07(31)	10.38(31)	12.23(18)	10.58(18)	11.95(6)	10.33(6)	12.16(24)	10.52(24)	12.11(55)	10.44(55)
Yanmar	.....	.....	11.95(1)	10.37(1)	.....	.....	11.95(1)	10.37(1)	11.95(1)	10.37(1)
Zetor	13.38(5)	11.24(5)	.....	.....	.....	.....	.....	.....	13.38(5)	11.24(5)
Average	**12.50(190)**	**10.87(190)**	**12.31(210)**	**10.58(210)**	**12.20(117)**	**10.47(117)**	**12.27(327)**	**10.54(327)**	**12.35(517)**	**10.66(517)**

*Numbers in parentheses indicate number of tractor tests averaged in that particular figure.
(a) Includes Fiat tests before Hesston-Fiat.
(b) Includes White, Minneapolis-Moline and Oliver tests.

pened to the "efficient big tractors" we've been told about? They don't seem to have been tested at Nebraska in the past 11 years.

Myth No. Two: Foreign tractors are more fuel efficient than American-made models. But that is not necessarily so either. Well, the 10 tractors with highest hp-hrs/gal at 75 per cent drawbar load (71-81) were all foreign-made. So, that still holds water. Those top 10 tractors included three Deutz, two Case-David Browns, two Hesston-Fiats, and one each by Massey-Ferguson, Belarus and Kubota.

But, for reasons we'll explain later, we've chosen to ignore at this point the low efficiency of IH hydrostatic drive tractors (seven of the 10 lowest tested). Then, at 75 per cent drawbar load (71-81) and without the hydrostatics, nine of the 10 *least* efficient tractors were also imports. These included four Kubotas, four Massey-Fergusons, and one Allis-Chalmers—plus a U.S.-made IH, non-hydrostatic.

The 10 most efficient tractors produced almost 50 per cent more work per gallon of fuel than did the lowest 10, including the hydrostatics, and did 40 per cent better than the bottom 10 without hydrostatic drives.

As a matter of interest, "most efficient" 10 is dominated by European models, and the lower 10 (without hydrostatic drive) are mostly Oriental tractors.

Overall, however, the chart indicates that foreign tractor lines generally average more hp-hrs/gal than do those of American companies (even though a number of their smaller models are imports, too). For instance, for the periods

(Continued on page 33)

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Fuel Efficiency

(Continued from page 19)

71-78 and 71-81, Deutz had the highest average efficiency at 75 per cent of drawbar load. However, in the past three years (79-81), Deutz average of 13.73 for five tractors fell below the Belarus average of 14.17 for two tractors, and Big Bud's single test effort of 13.97 (406 max. db hp). But, there aren't enough tractors involved for any of these firms to call the results a trend.

On the other hand, in 71-81 tests (75 per cent load) the least efficient Deutz (13.50 hp-hrs/gal) did more work per gallon of fuel than the top tractors tested by Allis-Chalmers, John Deere, Ford and International Harvester in the same test.

Why performance varies

By now, you may have formulated a number of reasons to rationalize the differences in average performance of various tractor lines. Some are certainly valid, others may be questionable.

Let's face it, European tractor designers have stressed fuel efficiency longer than have American engineers. As recently as five years ago, some American engineers admitted they were devoting very little more effort to fuel efficiency than they had been 10 years earlier. (The chart shows that average efficiency for the industry dropped 1.5 per cent at 75 per cent load and 2.7 per cent at 50 per cent load between the 59-70 and 71-78 periods...all years

(More ..)

Fuel Efficiency

(continued)

of cheap fuel or pre-fuel crisis engine designs.)

Is the industry really ignoring engine efficiency? Or, are they just building less efficient tractors? I believe that on the whole, engines are more efficient. But in recent years, we've added more ventilated, air conditioned and heated cabs; more sophisticated hydraulic systems; more power steering, power brakes, hydraulic clutches and more advanced transmissions; plus other features, each of which consume fuel and power. Understandably, not many tractor buyers would be willing to sacrifice many of those features for an increase in fuel efficiency.

Some designers also complain that meeting noise level and pollution regulations also reduces fuel efficiency. So, maybe we're lucky that efficiency hasn't dropped even further below that of tractors built 15 or 20 years ago. Without continual addition of small improvements, it would have.

The transmission used and operating speed certainly influence fuel economy and tractor performance. Most tractors tested in recent years develop maximum drawbar power at speeds above 5 mph, and some have exceeded 7 mph—much higher than in earlier years.

As we said earlier, seven of the 10 tractors with lowest fuel efficiency were IH hydrostatic drives. But even though the Nebraska Tractor Tests are intended to provide unbiased comparisons of different tractors, hydrostatic drives get a bum rap under those test conditions. They simply do not perform efficiently under constant load at constant speed for long periods. And few customers would buy a hydrostatic tractor for such work.

However, hydrostatic drives start paying off when the load, speed and direction of travel change frequently. This means they're ideal for front-end loader operation; for up-and-down hill operation or for frequently varying soil conditions; in stop-and-go work; or to provide optimum travel speed while maintaining constant pto speed. Fuel efficiency under those conditions may equal that of tractors with conventional transmissions, and certainly the comfort and convenience of operation is much better.

So, because hydrostatic drives don't fit the mold of other tractors, we chose to ignore them earlier when discussing the least efficient models. Their performance is, however, included in the IH averages shown in the chart.

So where are those bright spots?

Glancing through the industry averages at the bottom of the chart, we see that tractors tested in the last three years (79-81) were, on the average, less efficient than those tested in any other period. But there may be some turnaround. Belarus, Case-David Brown, John Deere, International Harvester, Kubota and Steiger all posted higher average efficiencies in 79-81 compared with their performances in 71-78. Hesston-Fiat and Long tractors tested in 79-81 showed better efficiency at 50 per cent load, but slightly lower economy at 75 per cent load, both compared with their 71-78 tests.

All these companies have had time since the 1973 fuel crisis to incorporate some engine modifications into recently-tested tractors and to start showing improved fuel efficiency.

With that many firms showing improvement, it's hard to explain why others were down. For instance, in 59-70 tests, Massey-Ferguson averaged 13.31 and 11.75 hp/hrs/gal., respectively, in the 75 and 50 per cent drawbar load tests—right at the top of the heap. By comparison, MF performance in 71-78 was off 11 and 14 per cent, respectively, from their earlier levels in the 75 and 50 per cent tests. But, Massey fuel economy in 79-81, compared with 59-70, slipped further. The MF average for 19 tractors in 79-81 was 15 and 19 per cent below the levels they bragged about in the 1960's. A plunge in efficiency of that magnitude can hardly be used to help boost equipment sales in a very tight market.

Back on the brighter side, International Harvester was one of only two companies whose tractors showed better efficiency in 79-81 than they did in 58-70. IH tractors improved slightly between those periods in spite of the inclusion of two low-efficiency hydrostatics in the later period.

But Hesston-Fiat tractor efficiency rose 20 and 28 per cent in the 75 and 50 per cent tests from 59-70 to 79-81. (Pre-Hesston Fiat tractors are included here.)

Although some White employees only reluctantly acknowledge existance of certain earlier models, White averages includes all White, Minneapolis-Moline and Oliver tractors, 59-81.

Where do we go from here?

The picture changes constantly. Only two IH 50 series tractors were included here. The new Deere four-wheel drives, Ford series 10, new A-C and other IH models will all go to Nebraska later. Versatile, too, has new models coming in 1982. Repeating this study next year might show more improvement for individual companies and the industry as a whole.

Users must consider performance first, and whether a given tractor can get their work done in the time they have available. They must also look at availability of parts and dealer service—will the dealer and manufacturer help him keep that tractor "available" whenever he has work to do? With existing economic and political conditions, tractor makers cannot ignore fuel efficiency. Actually, not many people really ignore it now—it's simply not given a very high priority.

Right now, more fuel is probably being saved by farmers who switched to conservation tillage than can be credited to more efficient tractors. In fact, energy savings are often the main reason farmers give for reducing field trips and changing tillage practices. High costs for fuel and other inputs are forcing farmers to cut corners wherever they can, and they've decided they can't wait on the industry to provide efficient tractors. Of course, they're saving soil and water, too, which they should have been doing already.

What does the industry have to say about this situation? We hope we'll find out. We have asked for manufacturers' comments, and we would also like to hear from other interested individuals. Watch for a later I&T article outlining the other positions on tractor fuel economy.

Send your comments directly to Frank Buckingham, Agri-Business Writing, 6451 E. Skyline Drive, Springfield, Mo. 65804. □

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An exclusive I&T monthly report of actual prices paid recently at these leading national wholesale auctions.

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Archbold, Ohio
February 8 & 9, 1982

INTERNATIONAL HARVESTER TRACTORS

Cub, mo. 1964 (Fair) 1900
Cub, ldr., mo. (Good) 2125
H, 1949 (Fair) 575*
H, (Good) 560
M, 1950 (Fair) 800
M, 1949 (Rough) 575
M, 1952 (Fair) 1175
M, (Good) 725
M, (Good) 825
M, (Fair) 700
Sup. M, (Fair) 1050
W-6, 1949 (Good) 750
140, cult., (Good) 3400
300, 1956 (Good) 875
400, (Good) 1125
400, (Fair) 1025
460, plow, 1957 (Fair) 1850
560, 1959 (Fair) 1850
560, duals, (Fair) 1600
560, 1961 (Fair) 2300*
560, (Good) 1700
656, 1967 (Fair) 2725
656, 1967 (Good) 4200*
706, (Fair) 2575
706 diesel, 1965 (Fair) 4000
706, (Fair) 4275
706, (Fair) 3200*
706 diesel, 1964 (Rough) 3200*
706 diesel, (Fair) 4150*
706 diesel, 1964 (Fair) 2925
756 diesel, 1969 (Good) 7000*
766, (Fair) 6000*
806, 1965 (Fair) 3550
806 diesel, 1965 (Rough) 3700
806 diesel, 1965 (Fair) 3300*
806, (Fair) 2100
806 diesel, 1965 (Fair) 4400
806 diesel, 1965 (Good) 3400*
806 diesel, (Good) 5900
806 diesel, 1964 (Fair) 3850*
856 diesel, 1967 (Rough) 5400*
856 diesel, (Fair) 5850*
856 diesel, 1967 (Good) 6975
966 diesel, (Fair) 8300
1066 diesel, cab, 1973 (Good) 9900*
1456 diesel, duals 1970 (Good) 8000*
1466 diesel, cab, 1974 (Good) 8600*
1466, (Good) 8800*
1468, 1973 (Good) 9200
1586 diesel, 1978 (Excellent) 15,000*
3788, 1981 (Excellent) 34,000*

ALLIS-CHALMERS TRACTORS

G, cult., 1950 (Rough) 1050*
WD, (Fair) 575
WD, (Fair) 550*
D-17, 1961 (Fair) 1675
D-17, 1959 (Fair) 1850
200 diesel, 1972 (Fair) 7600*
210 diesel, (Good) 7900

CASE/DAVID BROWN TRACTORS

990 diesel, 1971 (Rough) 2500*
1200 diesel, 1972 (Fair) 2800*
530, 1958 (Rough) 975
580-B, ... 7300
830 diesel, (Good) 1650
830 diesel, ... 1400
830 diesel, ... 1825*
830 diesel, 1961 (Rough) 1450*
1030 diesel, 1965 (Fair) 4000
1030 diesel, cab, (Good) 3950*
1070 diesel, 1971 (Fair) 6750
1175 diesel, 1975 (Fair) 5700*
1370 diesel, ... 6800*

OLIVER TRACTORS

1355 diesel, 1972 (Fair) 6700*
1450 diesel, 1965 (Fair) 2975
1555 diesel, 1971 (Good) 5000
1650 diesel, (Fair) 3450*
1800, 1959 (Fair) 2400*
1850, (Fair) 3100*
1855 diesel, (Fair) 5150
1950-turbo, 1966 (Fair) 3700*
2255 diesel, 1974 (Rough) 8250*

WHITE TRACTOR

2-155, 1978 (Fair) 12,000*

JOHN DEERE TRACTORS

A, 1951 (Fair) 500
M, cult., (Good) 925
40, ldr., 1955 (Fair) 1250
60, 1956 (Fair) 1200
60, (Fair) 575
70, 1955 (Rough) 800*
G, (Fair) 1175
440, ldr., (Fair) 2700
620, 1957 (Fair) 1450*
620, 1956 (Fair) 1450*
630, 1957 (Fair) 1550
720 diesel, 1957 (Fair) 1325*
730 diesel, 1957 (Fair) 2100*
730 diesel, 1957 (Fair) 1500*
3010, 1962 (Fair) 2450
3010, (Good) 3600
3020 diesel, 1968 (Good) 7700*
4010, 1962 (Fair) 3175
4010 diesel, 1961 (Fair) 4700*
4010 diesel, 1961 (Fair) 4750*
4020 diesel, 1966 (Fair) 6600*
4020 diesel, 1968 (Good) 7100*
4020 diesel, 1970 (Good) 6650*
4020, 1967 (Good) 6900*
4020 diesel, 1967 (Good) 7000*
4020 diesel, 1967 (Fair) 5400
4020 diesel, 1967 (Good) 6700*
4020 diesel, 1968 (Fair) 7000*
4020 diesel, 1967 (Good) 7400*
4230 diesel, 1972 (Good) 13,100*
4230 diesel, 1975 (Good) 10,900
4430 diesel, 1973 (Fair) 15,250*
4430 diesel, 1973 (Good) 13,000*
4430 diesel, 1974 (Good) 14,000*
4440 diesel, (New) 29,500*
4440 diesel, 1981 (Excellent) 30,000*
4630 diesel, 1974 (Fair) 12,000
4630, cab, (Good) 16,250
5020 diesel, 1968 (Good) 7000*
7520 diesel, (Fair) 9500*
JD 300, ldr., (Fair) 3575

FERGUSON/MASSEY-FERGUSON TRACTORS

50, 1958 (Fair) 1875
135 diesel, 1968 (Fair) 2750*
165 diesel, 1967 (Fair) 2975
165 diesel, 1968 (Fair) 3700
175, 1967 (Fair) 4675
1080 diesel, (Fair) 4050
1085 diesel, 1976 (Fair) 6325
1130 diesel, 1968 (Good) 5100*

COCKSHUTT TRACTORS

560, cult., 1954 (Fair) 1025
560 diesel, 1956 (Rough) 750*
1650, ... 2700*

FORD TRACTORS

8N, 1950 (Fair) 1000*
8N, (Good) 1275
8N, (Good) 1225
9N, 1944 (Rough) 710
Jub., 1954 (Fair) 1400
800, 1956 (Fair) 1800*
900, 1957 (Fair) 1250*
900, (Fair) 1300
961, (Good) 1875
3400, ldr., (Fair) 3675
3400, ldr., 1969 (Fair) 2925*
3600, 1978 (Fair) 5325
4000, Select-O-Speed, 1968 (Fair) 3600*
6000 diesel, 1963 (Fair) 1250*
8000 diesel, 1969 (Fair) 6500*
9600, 1974 (Fair) 6600
7600, (Fair) 7600

DEUTZ TRACTOR

D-13006, 1975 (Rough) 7000*

MASSEY-HARRIS TRACTORS

44, ldr., (Fair) 675*
44, (Fair) 375

MINNEAPOLIS-MOLINE TRACTORS

M-670, 1964 (Fair) 1800*
M-670 LP, (Fair) 1950*

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Dothan, Alabama
February 9, 1982

ALLIS-CHALMERS TRACTORS

7040 diesel, 1978 (Excellent) 12,000
7040 diesel, 1976 (Fair) 6000
XT190 diesel, 1970 (Fair) 3400*
180 diesel, 1976 (Fair) 3000
175 diesel, 1977 (Good) 4900
WC, 1945 (Rough) 50
WC, 1945 (Rough) 90

CASE TRACTORS

1070 diesel, 1973 (Good) 5800
480 diesel, 1966 (Rough) 510
SC, 1948 (Fair) 450

DAVID BROWN TRACTORS

990 diesel, 1968 (Good) 1900*
990 diesel, 1965 (Fair) 700

MASSEY-FERGUSON TRACTORS

1150 diesel, 1971 (Fair) 3750
1130 diesel, 1967 (Good) 4425
1105 diesel, 1976 (Good) 6600
1105 diesel, cab., 1974 (Fair) 3800*
1105 diesel, 1974 (Good) 6700
1105 diesel, 1974 (Excellent) 7100
1100 diesel, 1968 (Good) 4200
1085 diesel, 1977 (Fair) 5300
1080 diesel, 1971 (Good) 4300*
285 diesel, 1976 (Good) 5600
275 diesel, 1977 (Fair) 5550
275 diesel, 1976 (Good) 6100*
265 diesel, 1976 (Good) 6800
245 diesel, 1977 (Good) 4600*
205 diesel, 1979 (Good) 3400*
180 diesel, 1968 (Good) 3500
180 diesel, 1968 (Good) 3400*
180 diesel, 1967 (Fair) 2450
175 diesel, 1973 (Excellent) 5100*
175 diesel, 1972 (Good) 3900*
175 diesel, 1970 (Good) 3950
175 diesel, 1968 (Good) 3450
175 diesel, 1967 (Good) 3450
165 diesel, 1971 (Good) 3750
165 diesel, 1971 (Good) 3700
165 diesel, ldr., 1968 (Excellent) 4600
165 diesel, 1966 (Good) 3300
135 diesel, 1970 (Excellent) 3600
135, 1966 (Fair) 2350
135, 1966 (Good) 3200
135, 1966 (Good) 2750*
130 diesel, 1969 (Rough) 800
130 diesel, 1969 (Fair) 1250
130 diesel, 1969 (Good) 2200
65 diesel, 1963 (Good) 2150
65 diesel, 1962 (Rough) 1350
65 diesel, 1961 (Rough) 1075
50 diesel, ldr., backhoe, 1970 (Good) 4600*
50 diesel, 1962 (Excellent) 2100
50 diesel, 1962 (Excellent) 2150
50 diesel, 1962 (Good) 1300
35 diesel, 1959 (Good) 1000
35, 1958 (Fair) 900
35, 1958 (Good) 1550
TO30, 1953 (Good) 1350
TO30, 1952 (Rough) 350
TO20, 1950 (Good) 1050

FORD-FERGUSON TRACTOR

9N, 1944 (Good) 700

FORD TRACTORS

9000 diesel, 1973 (Excellent) 7000*
8700 diesel, cab, duals, 1978 (Excellent) 13,500*
8600 diesel, 1974 (Good) 5600*
7700 diesel, 1977 (Good) 9200*
7700 diesel, 1977 (Good) 9000
7000 diesel, 1975 (Fair) 4900
7000 diesel, 1974 (Good) 6050
6000 diesel, 1963 (Fair) 950*
5600 diesel, 1978 (Excellent) 9500*
5000 diesel, 1975 (Excellent) 5800
5000 diesel, 1971 (Good) 4700*
5000 diesel, 1970 (Good) 4200
5000 diesel, 1967 (Good) 3850*
5000 diesel, 1966 (Excellent) 4500*
5000 diesel, Select-O-Speed, 1966 (Fair) 2400*
5000 diesel, 1966 (Fair) 3000
4000, 1963 (Good) 1700
3600 diesel, 1975 (Excellent) 5800*
3400 diesel, ldr., 1966 (Excellent) 3750
3000 diesel, 1971 (Good) 3200
3000 diesel, 1971 (Excellent) 3550
3000 diesel, 1970 (Excellent) 3650
3000 diesel, 1966 (Good) 3150
3000 diesel, 1966 (Good) 2800*
3000 diesel, 1966 (Good) 3300*
2600 diesel, 1976 (Good) 4350
2000, 1964 (Good) 2150*
861, 1958 (Good) 1750
850, 1956 (Good) 1600
641, 1961 (Good) 2150
641, 1959 (Good) 1960
550 diesel, backhoe, ldr., 1975 (Excellent) 9250
Maj. diesel, 1953 (Good) 1000*
8N, 1952 (Rough) 675
8N, 1952 (Good) 1350
8N, 1950 (Good) 975
8N, 1949 (Excellent) 1300

INTERNATIONAL HARVESTER TRACTORS

1566, cab, duals, 1975 (Good) 9000*
1086 diesel, 1971 (Excellent) 6400
856 diesel, 1968 (Fair) 3150
766 diesel, 1972 (Good) 6400*
684 diesel, 1978 (Excellent) 7400*
574 diesel, 1972 (Rough) 2000*
544 diesel, 1970 (Good) 2850
504, trencher, bld., 1966 (Good) 1500*
404, 1964 (Good) 1450*
H, silage ldr., 1944 (Good) 725
140, cult., 1961 (Excellent) 3200
100, ldr., bld., 1955 (Good) 1600
Sup. C, cutter, bld., 1954 (Excellent) 1450
Sup. A, cult., plt., 1953 (Excellent) 2200
Sup. A, cult., 1953 (Excellent) 2250
185 Cub Loboy, mo., 1975 (Good) 1250
Cub, cult., 1948 (Good) 1250
Cub, cult., plt., plow, mo., 1948 (Fair) 1075
Cub, cult., 1948 (Excellent) 1600
Cub, mo., 1948 (Good) 1300*
Cub, mo., 1948 (Good) 1025

JOHN DEERE TRACTORS

4440 diesel, 1978 (Excellent) 15,700*
4430 diesel, 1973 (Good) 7100
4020 diesel, 1972 (Good) 6600*
4020 diesel, 1965 (Good) 5200*
3020 diesel, 1970 (Good) 5500*
3020, LP 1965 (Rough) 1900
3020 diesel, 1965 (Excellent) 4900
3020 diesel, 1965 (Good) 3700
3010, 1962 (Rough) 1900*
2030, 1973 (Good) 4300*
2020, 1969 (Excellent) 4400
2020, 1968 (Good) 3300*
2010, ldr., 1962 (Fair) 1100*
1020 diesel, 1968 (Good) 3300
1020 diesel, 1968 (Good) 3500
430, 1958 (Good) 1300*
40, 1953 (Good) 825

KUBOTA TRACTOR

L175 diesel, (Good) 1725

LONG TRACTORS

445 diesel, (Good) 2000*
360 diesel, (Good) 3100*

MINNEAPOLIS-MOLINE TRACTORS

G1355 diesel, 1973 (Good) 5600
Jet Star 3 diesel, 1967 (Fair) 1125

OLIVER TRACTORS

2155 diesel, duals, 1977 (Fair) 4000
2150 diesel, 1969 (Fair) 3100
2-150 diesel, 1976 (Good) 10,750
1755 diesel, 1974 (Good) 4700
1655 diesel, 1971 (Good) 4600
1550 diesel, 1966 (Rough) 1000

NOTES
Prices reported are for individual sales at wholesale on "as is," "cash and carry" basis.
Prices reported are NOT averages.

Condition classifications: EXCELLENT means—Engine: in perfect condition, 400 to 600 hours of use; Rubber: 80% tread remaining, no breaks or cracks; Paint: original and bright; General Appearance: excellent.

GOOD means—Engine: good running condition; Rubber: 70% tread remaining, no breaks or cracks; Paint: original paint or a good repaint job; General Appearance: good over-all.

FAIR means—Engine: possibly in need of a minor overhaul to restore; Rubber: 60% tread remaining, some cracking evident in side walls; Paint: only fair, weathered and some rust apparent; General Appearance: worn, some dents, minor parts such as gage covers missing or broken.

ROUGH means—Engine: obviously in need of a major overhaul; Rubber: smooth; Paint: scarred, weathered, rusty, needs painting urgently; General Appearance: dents, ruptures, broken parts, loose wires, some components such as lights broken, missing or inoperative.

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